State of Utah

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Department of Administrative Services
KIMBERLY K. HOOD
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Division of Facilities Construction and Management
DAVID G. BUXTON
Director

ADDENDUM NO. 2

Date: October 14, 2008

To: Contractors

From: Craig Wessman, Project Manager, DFCM

Reference: BDAC Building Sidewalk and Maintenance Building Parking Lot Improvements
College of Eastern Utah – Price, Utah
DFCM Project No. 06162610

Subject: **Addendum No. 2**

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	Engineer's Addendum	9	page
	Total	10	pages

Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.

While we contend that SB220 should only be potentially applicable to a contract issued after the effective date of said bill, this is to clarify that for purposes of this contract, regardless of the execution or effective dates of this contract, the status of Utah Law and remedies available to the State of Utah and DFCM, as it relates to any matter referred to or affected by said SB220, shall be the Utah law in effect at the time of the issuance of this Addendum.

2.1 SCHEDULE CHANGES: None

2.2 GENERAL ITEMS: Drawing clarifications and Modular Block Wall Specification.

ADDENDUM No. 2
TO REQUEST FOR PROPOSAL
TO PROVIDE
CONSTRUCTION SERVICES

DFCM

CEU BDAC SIDEWALK AND PARKING LOT PROJECT

Nolte Associates, Inc.

DATE: October 14, 2008

1. Change note 1 on drawing sheet 4. The new note shall read: "Install concrete pavement per detail D-1 on sheet 5." Detail D on sheet 5 shown as Asphalt Section is eliminated from the drawings. There is no asphalt required on the project. Concrete pavement is the required surface and is the base bid item required for the project.

2. Note 9 on drawing sheet 4 shall read as follows: “Install van accessible disabled parking sign, handicap stall with painted symbol, and install 8’ loading zone on the right per ANSI A117.1”.

3. Add construction note 14 on drawing sheet 4 to clarify to the Code Official the intent of pedestrian access on this site. The note shall read: "Pedestrian Path." This clarifies that the pedestrian path from the Maintenance Bldg is intended to be from the door of the building to the street, south along the sidewalk and then west onto the sidewalk running parallel to the new retaining wall and meeting up with the new sidewalk at the bottom of the ramp from the parking lot. This is a code related item and should not add cost to the project. Item 4 below will further clarify the intent and the cost of the signs should be added to the project.

4. Add construction note 15 and this refers to the ramp from the parking lot to the new north south sidewalk installed under this project. Note 15 shall read as follows: “Install two “Pedestrian and bicycles prohibited” R5-10B signs per current edition of MUTCD at top and bottom of ramp.”

5. The attached Modular Block Retaining Wall System specification is added to the contract documents and the retaining wall must meet the requirements of this section. The contractor shall submit drawings and specification for all retaining walls onsite for review and acceptance by the engineer (drawings to be submitted to engineer, with sufficient time to review, prior to construction).

Specification Guidelines: Modular Block Retaining Wall System

PART 1 GENERAL

1.1 Scope

A. Work shall consist of furnishing and installing concrete retaining wall units in accordance with these specifications and in reasonably close conformity with the lines, grades, design, and dimensions shown on the plans.

B. Work includes preparing foundation soil, furnishing and installing leveling pad, unit drainage fill and backfill to the lines and grades shown on the construction drawings.

C. Work includes furnishing and installing geogrid soil reinforcement of the type, size, location, and lengths designated on the construction drawings.

1.2 Applicable Sections of Related Work

Site Preparation (Section 02100)
Excavating, Backfill and Compaction (Section 02200)

1.3 Reference Standards – Unless overwise noted most recent standard should be used

A. American Society for Testing and Materials (ASTM)

1. ASTM C-140 Sample and Testing Concrete Masonry Units
2. ASTM C-1372 Specification for Segmental Retaining Wall Units
3. ASTM D-422 Particle Size Analysis
4. ASTM D-698 Laboratory Compaction Characteristics of Soil -Standard Effort
5. ASTM D-4318 Liquid Limit, Plastic Limit and Plasticity Index of Soils
6. ASTM D-4595 Tensile Properties of Geotextiles - Wide Width Strip
7. ASTM D-5262 Unconfined Tension Creep Behavior of Geosynthetics
8. ASTM D-3034 Polyvinyl Chloride Pipe (PVC)
9. ASTM D-1248 Corrugated Plastic Pipe
10. ASTM 1262 Evaluating the Freeze Thaw Durability of Manufactured CMU’s and Related Concrete Units

B. Geosynthetic Research Institute (GRI)

1. GRI-GG4 Determination of Long Tern Design Strength of Geogrids
2. GRI-GG5 Determination of Geogrid (soil) Pullout

C. National Concrete Masonry Association

1. NCMA SRWU-1 Test Method for Determining Connection Strength of SRW
2. NCMA SRWU-2 Test Method for Determining Shear Strength of SRW

1.4 Submittals/Certification

A. Contractor shall submit a Manufacturer's certification, prior to start of work, that the retaining wall system components meet the requirements of this specification and the structure design.

B. Contractor shall submit construction drawings and design calculations for the retaining wall system prepared and stamped by a Professional Engineer registered in the state of

the project. The engineering designs, techniques, and material evaluations shall be in accordance with applicable codes.

C. Contractor shall submit a test report documenting strength of specific modular concrete unit and geogrid reinforcement connection. The maximum design tensile load of the geogrid shall be equal to the laboratory tested ultimate strength of geogrid / facing unit connection at a maximum normal force limited by the "Hinge Height" of the structure divided by a safety factor of 1.5. The connection strength evaluation shall be performed in accordance with NCMA test method SRWU-1.

1.5 Quality Assurance

A. Contractor shall submit certification, prior to start of work, that the retaining wall system (modular concrete units and specific geogrid):

1. has been successfully utilized on a minimum of five (5) similar projects, i.e., height, soil fill types, erection tolerances, etc.; and

2. has been successfully installed on a minimum of 1 million (1,000,000) square feet of retaining walls.

B. Contractor shall submit a list of five (5) previously constructed projects of similar size and magnitude by the wall installer where the specific retaining wall system has been constructed successfully. Contact names and telephone numbers shall be listed for each project.

C. Contractor shall provide evidence that the design engineer has a minimum of five years of documentable experience in the design for reinforced soil structures. The design engineer shall provide proof of current professional liability insurance with an aggregate coverage limit of not less than $2,000,000.

D. Owner shall provide soil testing and quality assurance inspection during earthwork and wall construction operations. Owner's quality assurance program does not relieve the contractor of responsibility for wall performance.

1.6 Delivery, Storage, and Handling

A. Contractor shall check the materials upon delivery to assure proper material type, grade, color, and certification has been received.

B. Contractor shall prevent excessive mud, wet cement, and like construction debris from coming in contact with the materials.

C. Contractor shall protect the materials from damage. Damaged material shall not be incorporated in the project (ASTM C1372).

PART 2: MATERIALS

2.1 Definitions

A. Modular Unit - a concrete retaining wall element machine made from portland cement, water, and aggregates.

B. Structural Geogrid - a structural element formed by a regular network of integrally connected tensile elements with apertures of sufficient size to allow interlocking with surrounding soil, rock, or earth and function primarily as reinforcement.

C. Unit Drainage Fill - drainage aggregate which is placed within and immediately behind the modular concrete units.

D. Reinforced Backfill - compacted soil which is placed within the reinforced soil volume as outlined on the plans.

2.2 Modular Wall Units

A. Wall units shall have minimum 28 day compressive strength of 3000 psi (20.7 MPa) in accordance with ASTM C1372. The concrete units shall have adequate freeze-thaw protection in accordance with ASTM C1372 or an average absorption rate of 7.5 lb/ft^3 (120 kg/m^3) for northern climates and 10 lb/ft^3 (160 kg/m^3) for southern climates.

B. Exterior dimensions shall be uniform and consistent. Maximum dimensional deviations on the height of any two units shall be 0.125 in. (3 mm).

C. Wall units shall provide a minimum of 110 lbs total weight per square foot of wall face area (555 kg/m2). Fill contained within the units may be considered 80% effective weight.

D. Exterior face shall be textured. Color as specified by owner.

2.3 Shear Connectors

A. Shear connectors shall be 1/2 inch diameter thermoset isopthalic polyester resin-pultruded fiberglass reinforcement rods or equivalent to provide connection between vertically and horizontally adjacent units. Strength of shear connectors between vertical adjacent units shall be applicable over a design temperature of 10 degrees F to + 100 degrees F.

B. Shear connectors shall be capable of holding the geogrid in the proper design position during grid pre-tensioning and backfilling.

2.4 Base Leveling Pad

A. Material shall consist of a compacted crushed stone base or non-reinforced concrete as shown on the construction drawings.

2.5 Drainage

A. Internal and external drainage shall be evaluated by the registered Professional Engineer who is responsible for the final wall design.

2.6 Infill Soil

A. Infill material shall be site excavated soils when approved by the on-site soils engineer unless otherwise specified in the drawings. Unsuitable soils for backfill (heavy clays or organic soils) shall not be used in the reinforced soil mass. Fine grained cohesive soils (f<31°) may be used in wall construction, but additional backfilling, compaction and

water management efforts are required. Poorly graded sands, expansive clays and/or soils with a plasticity index (PI) >20 or a liquid limit (LL) >40 should not be used in wall construction.

B. The infill soil used must meet or exceed the designed friction angle and description noted on the design cross sections, and must be free of debris and consist of one of the following inorganic USCS soil types: GP, GW, SW, SP, SM, SM-SC meeting the following gradation as determined in accordance with ASTM D422.

Sieve Size	Percent Passing
4 inch	100 – 75
No. 4	100 – 20
No. 40	0 - 60
No. 200	0 - 35

C. The maximum aggregate size shall be limited to ¾ inch unless field tests have been performed to evaluate potential strength reductions to the geogrid design due to damage during construction.

D. Where additional fill is required, contractor shall submit sample and specifications to the wall design engineer or the on-site soils engineer for approval and the approving engineer must certify that the soils proposed for use has properties meeting or exceeding original design standards.

2.7 Geogrid

A. Geosynthetic reinforcement shall consist of geogrids manufactured specifically for soil reinforcement applications and shall be manufactured from high tenacity polyester yarn or high density polyethylene. Polyester geogrid shall be knitted from high tenacity polyester filament yarn with a molecular weight exceeding 25,000 Meg/m and a carboxyl end group values less than 30. Polyester geogrid shall be coated with an impregnated PVC coating that resists peeling, cracking, and stripping.

B. Geogrid design shall be evaluated by a registered Professional Engineer who is responsible for the final wall design and shall include geogrid type, size, location, and length of geogrid.

C. The maximum design tensile load of the geogrid shall not exceed the laboratory tested ultimate strength of the geogrid/facing unit connection as limited by the "Hinge Height" divided by a factor of safety of 1.5. The connection strength testing and computation procedures shall be in accordance with NCMA SRWU-1 Test Method for Determining Connection Strength of SRW.

D. Soil Interaction Coefficient, Ci
Ci values shall be determined per GRI:GG5 at a maximum 0.75 inch displacement.

E. Manufacturing Quality Control
The geogrid manufacturer shall have a manufacturing quality control program that includes QC testing by an independent laboratory.
The QC testing shall include:
Tensile Strength Testing

Melt Flow Index (HDPE)
Molecular Weight (Polyester)

2.8 Drainage Pipe

A. If required, the drainage pipe shall be perforated or slotted PVC pipe manufactured in accordance with ASTM D-3034 or corrugated HDPE pipe manufactured in accordance with ASTM D-1248.

PART 3: WALL CONSTRUCTION

3.1 Excavation

A. Contractor shall excavate to the lines and grades shown on the construction drawings. Contractor shall use caution not to over-excavate beyond the lines shown, or to disturb the base elevations beyond those shown, without prior approval of the engineer and owner.

B. Over-excavation and replacement of unsuitable foundation soils and replacement with approved compacted fill will be compensated as agreed upon with the Owner.

C. Contractor shall verify locations of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of wall excavation.

3.2 Foundation Soil Preparation

A. Foundation soil shall be defined as any soils located beneath a wall.

B. Foundation soil shall be excavated as dimensioned on the plans and compacted to a minimum of 95% of Standard Proctor (ASTM D698) prior to placement of the base material.

C. Foundation soil shall be examined by the on-site soils engineer to ensure that the actual foundation soil strength meets or exceeds assumed design strength. Soil not meeting the required strength shall be removed and replaced with acceptable material.

3.3 Base Leveling Pad

A. Base material shall be placed as shown on the construction drawing. Top of base shall be located to allow bottom wall units to be buried to proper depths as per wall heights and specifications.

B. Base material shall be installed on undisturbed native soils or suitable replacement fills compacted to a minimum of 95% Standard Proctor (ASTM D698).

C. Base shall be compacted at 95% Standard Proctor (ASTM D698) to provide a level hard surface on which to place the first course of blocks. The base shall be constructed to ensure proper wall embedment and the final elevation shown on the plans. Well-graded sand can be used to smooth the top 1/2 in. (13 mm) on the base material.

D. Base material shall be a 4 in. (100 mm) minimum depth for walls under 4 ft (1.2 m) and a 6 in. (150 mm) minimum depth for walls over 4 ft (1.2 m).

3.4 Modular Unit Installation

A. First course of units shall be placed on the leveling pad at the appropriate line and grade. Alignment and level shall be checked in all directions and insure that all units are in full contact with the base and properly seated.

B. Ensure that units are in full contact with the leveling pad. Proper care shall be taken to develop straight lines and smooth curves on base course per wall layout.

C. Place the front of units side-by-side. Do not leave gaps between adjacent units. Layout of corners and curves shall be in accordance with manufacturer's recommendations.

D. Install shear/connecting devices per manufacturer's recommendations.

E. Place and compact drainage fill within and behind wall units. Place and compact backfill soil behind drainage fill. Follow wall erection and drainage fill closely with structure backfill.

F. Maximum stacked vertical height of wall units, prior to unit drainage fill and backfill placement and compaction, shall not exceed two courses.

3.5 Geogrid Installation

A. Geogrid shall be oriented with the highest strength axis perpendicular to the wall alignment.

B. Geogrid reinforcement shall be placed at the strengths, lengths, and elevations shown on the construction design drawings or as directed by the Engineer.

C. The geogrid shall be laid horizontally on compacted backfill and attached to the modular wall units. Place the next course of modular concrete units over the geogrid. The geogrid shall be pulled taut, and anchored prior to backfill placement on the geogrid.

D. Geogrid reinforcements shall be continuous throughout their embedment lengths and placed side-by-side to provide 100% coverage at each level. Spliced connections between shorter pieces of geogrid or gaps between adjacent pieces of geogrid are not permitted.

3.6 Reinforced Backfill Placement

A. Reinforced backfill shall be placed, spread, and compacted in such a manner that minimizes the development of slack in the geogrid and installation damage.

B. Reinforced backfill shall be placed and compacted in lifts not to exceed 6 inches where hand compaction is used, or 8 - 10 inches where heavy compaction equipment is used. Lift thickness shall be decreased to achieve the required density as required.

C. Reinforced backfill shall be compacted to 95% of the maximum density as determined by ASTM D698. The moisture content of the backfill material prior to and during compaction shall be uniformly distributed throughout each layer and shall be dry of optimum, + 0%, - 3%.

D. Only lightweight hand-operated equipment shall be allowed within 3 feet from the tail of the modular concrete unit.

E. Tracked construction equipment shall not be operated directly upon the geogrid reinforcement. A minimum fill thickness of 6 inches is required prior to operation of tracked vehicles over the geogrid. Tracked vehicle turning should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.

F. Rubber tired equipment may pass over geogrid reinforcement at slow speeds, less than 10 MPH. Sudden braking and sharp turning shall be avoided.

G. At the end of each day's operation, the Contractor shall slope the last lift of reinforced backfill away from the wall units to direct runoff away from wall face. The Contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.

3.7 Cap Installation

A. Cap units shall be glued to underlying units with an all-weather adhesive recommended by the manufacturer.

3.8 As-built Construction Tolerances

A. Vertical alignment : ± 1.5" over any 10' distance.

B. Wall Batter: within 2 degrees of design batter.

C. Horizontal alignment: ± 1.5" over any 10' distance.
Corners, bends, curves ± 1 ft to theoretical location.

D. Maximum horizontal gap between erected units shall be 1/2 inch.

3.9 Field Quality Control

A. The Owner shall engage inspection and testing services, including independent laboratories, to provide quality assurance and testing services during construction. This does not relieve the Contractor from securing the necessary construction control testing during construction.

B. Testing and inspections services shall only be performed by qualified and experienced technicians and engineers.

C. As a minimum, quality assurance testing should include foundation soil inspection, soil and backfill testing, verification of design parameters, and observation of construction for general compliance with design drawings and specifications.